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Occultation of the planet Jupiter and two Satellites by the Moon on August 7, 1889; *observed at the Radcliffe Observatory, Oxford.*

By E. J. Stone, Esq., M.A., F.R.S., Radcliffe Observer.

The heliometer and 7-inch telescope were unavailable for the observation of the disappearance, from the obstruction of the view by trees and buildings. The reappearance, from the same cause, could not be observed with the heliometer.

I watched for the reappearance of *Jupiter* with the 7-inch instrument, power 125, but the first appearance was lost from passing cloud. The sky gradually cleared and I was able to see the rest of the phenomena without any interference from cloud. I saw nothing of the nature of distortion or shadow, although, as I had no clock or chronometer, my attention was particularly directed to these points.

The contrast of brightness between *Jupiter* and the Moon was very striking.

Owing to passing cloud the first contact at reappearance was not seen by the three observers stationed near the main building, but it was apparently well observed with the Barclay Equatorial, about 100 yards west.

The following are the times of contacts and remarks, given by the other observers:—

The planet Jupiter.

Disappearance, at Moon's dark limb.

	Local Sidereal Time. h m s	G.M.T. of Observation. h m s	Observer.
First contact	16 4 33·7	7 3 39·0	W.
,, ...	16 4 35·2	7 3 (40·5)	R.
,, ...	16 4 39·7	7 3 (45·0)	F. B.
♃ dichotomised	16 5 8·7	7 4 14·0	W.
,, ...	16 5 15·2	7 4 20·4	R.
Last appearance	16 6 8·7	7 5 13·8	W.
,, ...	16 6 8·5	7 5 13·6	R.
,, ...	16 6 8·2	7 5 13·3	F. B.

Reappearance, at Moon's bright limb.

	Local Sidereal Time. h m s	G.M.T. of Observation. h m s	Observer.
First contact	16 59 5·1	7 58 1·5	R.
♃ projecting, say $\frac{1}{6}$ of diameter	16 59 30·7	7 58 27·1	W.
Dichotomised	16 59 46·7	7 58 43·0	W.
,, ...	16 59 55·1	7 58 51·4	R.
Last contact	17 0 56·7	7 59 52·8	W.
,, ...	17 0 51·6	7 59 47·7	R.

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Jupiter's Satellites.

Reappearance, at Moon's bright limb.

			Local Sidereal Time. h	m	s	G.M.T. of Observation. h	m	s	Observer.
Satellite II.	First seen	...	17	5	26·6	8	4	22·0	R.
,,	,,	...	17	5	40·7	8	4	36·1	W.
Satellite IV.	First seen	...	17	(19)	10·1	8	18	3·3	R.
,,	,,	...	17	19	31·7	8	18	24·8	W.

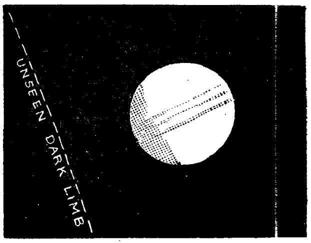
Clouds were frequently passing.

Observers' Remarks.

Mr. W. Wickham. Marlborough Telescope: aperture, 3¼-inch; power, 80.

Disappearance of *Jupiter.*

At 1½ᵐ before first contact a shadow, like a crape veil, on the disc of *Jupiter* was noticed darkening that part of the planet nearest the Moon (similar to the "Earth-shine" on the new Moon), but extending over roughly $\frac{1}{6}$ of *Jupiter's* disc from the first limb.



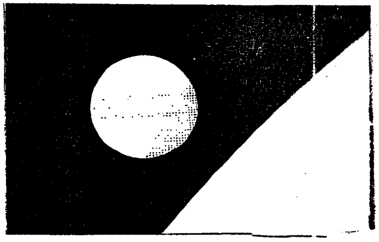
The time of "last appearance" considered very good, a tiny speck of light being last seen of the limb.

Reappearance of *Jupiter.*

First contact. Just lost in cloud, which after passing showed part of *Jupiter* projecting (say $\frac{1}{6}$ of its diameter).

Last contact. Good; sharp tangent, no black drop; the time noted is when a line of discontinuity was just shown between *Jupiter* and the Moon's limb.

The shadow noted at Disappearance was also seen at Reappearance on the following side of *Jupiter*, after the planet was quite free from the Moon, for about 2^{m} of time from last contact, it then (8^{h} 2^{m} ± G.M.T.) gradually paled, but was still visible for another 2^{m} or 3^{m}.



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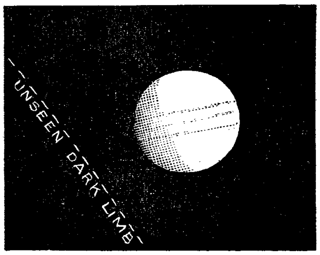
Reappearance of Satellite IV.

Very faint, may be 1^s in error.

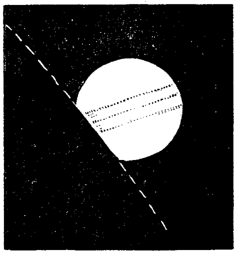
Mr. W. H. Robinson. Barclay Equatorial: aperture, 10-inch; power, 100.

Disappearance of *Jupiter.*

About 1^m before the first contact of *Jupiter* with the dark limb of the Moon I observed a change in the appearance of *Jupiter*, one quarter of the disc of the planet nearest the Moon's advancing limb being ill-defined and shaded, while the remaining $\frac{3}{4}$ of disc was sharply defined.



After watching this interference phenomenon for several seconds, I looked away in order to ascertain if it were caused by cloud, and, concluding that it was not, I resumed my observation at the telescope, when I found that I had just missed the first contact, the Moon's sharp edge having distinctly cut into *Jupiter*, thus:—



When the Moon's dark limb was well on *Jupiter* there appeared to be a bright line on *Jupiter* immediately contiguous to the Moon's limb.

Last contact. Good, almost instantaneous.

Reappearance of *Jupiter.*

First contact. Observation considered good. Well seen. The merest trace of *Jupiter's* limb visible. Very pale in comparison with Moon's bright limb.

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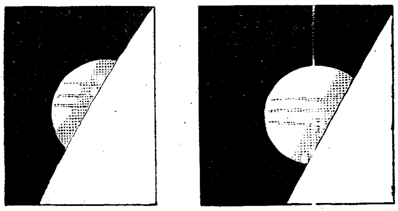
As the Moon receded, an unmistakable shade (about $\frac{1}{4}$ of *Jupiter's* diameter) was seen projected on Jupiter, thus :—



This shaded band was parallel to the Moon's limb, and was visible during the whole of the transit of the Moon's limb over *Jupiter*.

Last contact. Half a second *before* the time given, *Jupiter* was "hanging on" the Moon.
Half a second *after* "last contact" *Jupiter* just free from Moon's limb.

Reappearance of *Jupiter's* Satellites.

Good observations.

Mr. F. A. Bellamy. Dollond Telescope: aperture, $3\frac{3}{4}$-inch; power, 80.

Disappearance of *Jupiter.*

First contact. Bad definition, no sharp edge; may be quite 5^{s} late.

Last contact. Good observation. Limb very sharp. Quite satisfactory.

Radcliffe Observatory, Oxford:
1889, *November* 7.

Occultation of Jupiter by the Moon, 1889 *August* 7, *observed at Forest Lodge, Maresfield.* By Captain William Noble.

As the Sun was still above the horizon when the occultation began, and lighted a cirrous haze drifting over the Moon and *Jupiter*, the observation of disappearance was extremely difficult. The planet looked like the veriest ghost of itself, and had to be very steadily regarded for a defined limb to be seen at all. The actual observation of first contact was simply impossible; but by $16^{h}\ 11^{m}\ 1^{s}$ L.S.T. the Moon's limb had perceptibly encroached on *Jupiter*, who finally disappeared at $16^{h}\ 12^{m}\ 32^{s}{\cdot}6$ L.S.T. $=7^{h}\ 6^{m}\ 34^{s}{\cdot}9$ L.M.T., or $7^{h}\ 16^{m}\ 17^{s}{\cdot}8$ G.M.T. The interest of the occultation, however, culminated in the reappearance of the planet; the first glimpse of which I caught at $17^{h}\ 5^{m}\ 52^{s}{\cdot}4$ L.S.T., perhaps one or two seconds late. It had finally emerged, and, as nearly as I could judge, its limb and that of the Moon were tangent at $17^{h}\ 7^{m}\ 45^{s}{\cdot}4$ L.S.T.$=8^{h}\ 1^{m}\ 38^{s}{\cdot}68$ L.M.T., or